

Cybersecurity 2023 – 2024

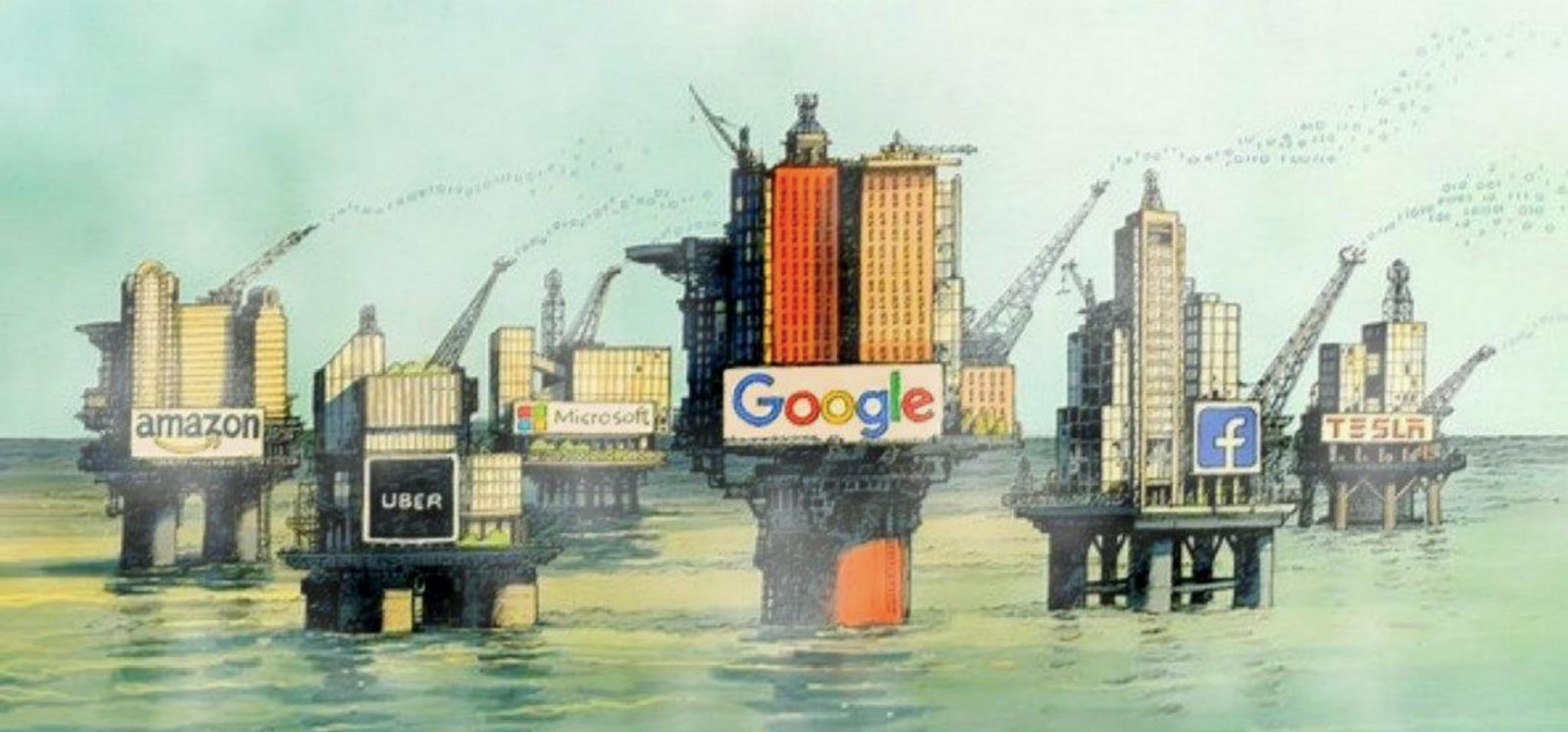
Prof. Christos Xenakis



University of Piraeus

Systems Security Laboratory (SSL)
Department of Digital Systems





The world's most valuable resource is no longer oil, but data.

The Economist - May 2017

David Parkins

Data Volume Growth Continues @ Rapid Clip... % Structured / Tagged (~10%) Rising Fast...

Information Created Worldwide = Expected to Continue Accelerating



Before COVID-19



© marketoonist.com

After COVID-19

"We've seen two years' worth of digital transformation in two months. From remote teamwork and learning, to sales and customer service, to critical cloud infrastructure and security - we are working alongside customers every day to help them adapt and stay open for business in a world of remote everything."

Satya Nadella
Microsoft CEO



Cybersecurity in Numbers

- 15% annual increase of costs related to **cyber crime**
 - It will reach **\$10.5 trillion** a year in 2025
- 57% of companies have a **cybersecurity skills shortage**.
- 68% of business leaders feel their **cybersecurity risks are increasing**.
- 62% of American data breaches lead to C-level executives '**resignation or termination**
- 90% of the human population, aged **6 years and older**, will be **online by 2030**.



Cybersecurity in Numbers

- The world will need to cyber **protect 200 Zettabytes** of data by 2025.
- The world will need to secure **338 Billion lines of new software code** in 2025.
- Businesses suffer **ransomware attacks every 40 seconds**.
- The average cost of a data breach to SME can range from **\$120,000 to \$1.24 million**.
- Zero trust security policies saved **\$1.76 million per breach**
- **71.1 million** people fall victim to **cyber crimes** yearly.
- Individuals lose **\$318 billion to cybercrime**.



Sept 2023 Cyber Attacks

LAS VEGAS CYBER ATTACK



LIVE. LOCAL. NOW.
MGM STILL IMPACTED BY CYBERSECURITY BREACH
GOVERNOR AND GAMING CONTROL BOARD ARE MONITORING THE SITUATION
FORECAST



WE ARE CURRENTLY EXPERIENCING UNFORESEEN DIFFICULTIES, BUT ARE DILIGENTLY WORKING TO RESOLVE THIS AS SOON AS POSSIBLE. OUR SLOT MACHINES ARE AVAILABLE TO PLAY WITH CASH.

FOR MGM REWARDS MEMBERS, PLEASE INSERT YOUR CARD (LIGHT AROUND CARD MUST BE GREEN). SLOT PLAY WILL BE RECORDED AND CREDITED TO YOUR ACCOUNT WHEN OUR SYSTEMS ARE BACK ONLINE. FREEPLAY AND SLOT DOLLAR REDEMPTION ARE NOT AVAILABLE AT THIS TIME.

WHEN PLAY IS COMPLETED, PRESS THE CASH OUT BUTTON, AND THE AMOUNT WILL BE PAID IN CASH IN PERSON AT THE MACHINE BY A ATTENDANT. THANK YOU FOR YOUR PATIENCE.



MGM Resorts computers back up after 10 days as analysts eye effects of casino cyberattacks

MGM Resorts Las Vegas cyber attack could be costing up to \$8.4 million A DAY as computer systems remain down: New hire claims his paycheck has been delayed in the chaos

Hospitality and entertainment giant MGM Resorts said costs from last month's debilitating ransomware infection have exceeded \$110 million, including \$10 million in one-time consulting clean-up fees.

MGM Attack Flow (September 2023)



Other Recent Cyber Attacks abroad & in Greece

ATTENTION

MOVEit

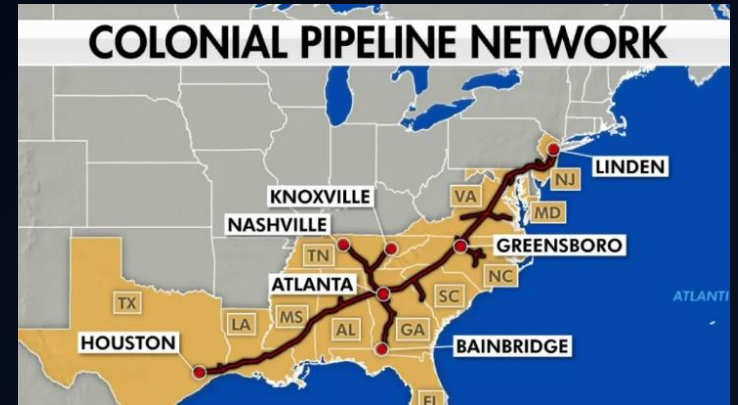
Mass-Hack

CLOPA_LEAKS

WARNING

- 22 Million individuals
- 400+ organizations

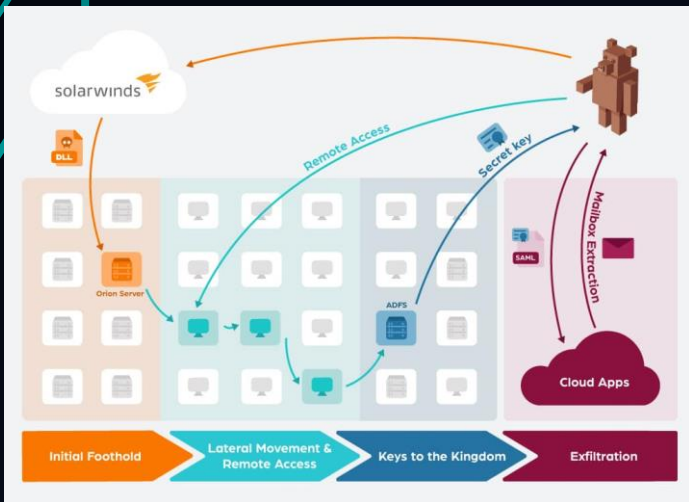
DISCORD PASSWORD STEALERS



Η ΕΠΙΘΕΣΗ ΤΩΝ ΧΑΚΕΡ ΚΑΙ ΠΩΣ ΑΠΟΚΡΟΥΣΤΗΚΕ

Ζήτησαν λύτρα από τα ΕΛΤΑ

- Η διοίκηση του οργανισμού δεν μπόρεσε να διαλέξει με τους χάκερ
- Η κυβερνο-επίθεση έγινε στις θυρίδες και το σύστημα μεταφοράς πακέτων
- Ποιά μεθοδολογία ακολουθήθηκε
- Τι προέκυψε από την έρευνα της ΕΥΠ για την ταυτότητα των δράστών
- Κανένας κίνδυνος για τις συντάξεις από την επίθεση
- Κερκόπορτα ο απαραίτητος πληροφοριακός εξοπλισμός



ΔΗΜΑΡΧΕΙΑΚΟ ΜΕΓΑΡΟ απευθείας ΕΛΕΝΑ ΤΖΙΟΤΑ

ΕΙΔΗΣΕΙΣ

ΔΙΑΡΡΗΧΗ ΠΡΟΣΩΠΙΚΩΝ ΔΕΔΟΜΕΝΩΝ ΜΕΤΑ ΤΗΝ ΚΥΒΕΡΝΟΕΠΙΘΕΣΗ ΠΟΥ ΔΕΧΘΗΚΕ Ο ΔΗΜΟΣ ΘΕΣΣΑΛΟΝΙΚΗΣ

www.ert.gr

#MegaLiveNews

ΝΙΚΗ ΚΕΡΑΜΕΩΣ - πρώην Υπουργός Παιδείας

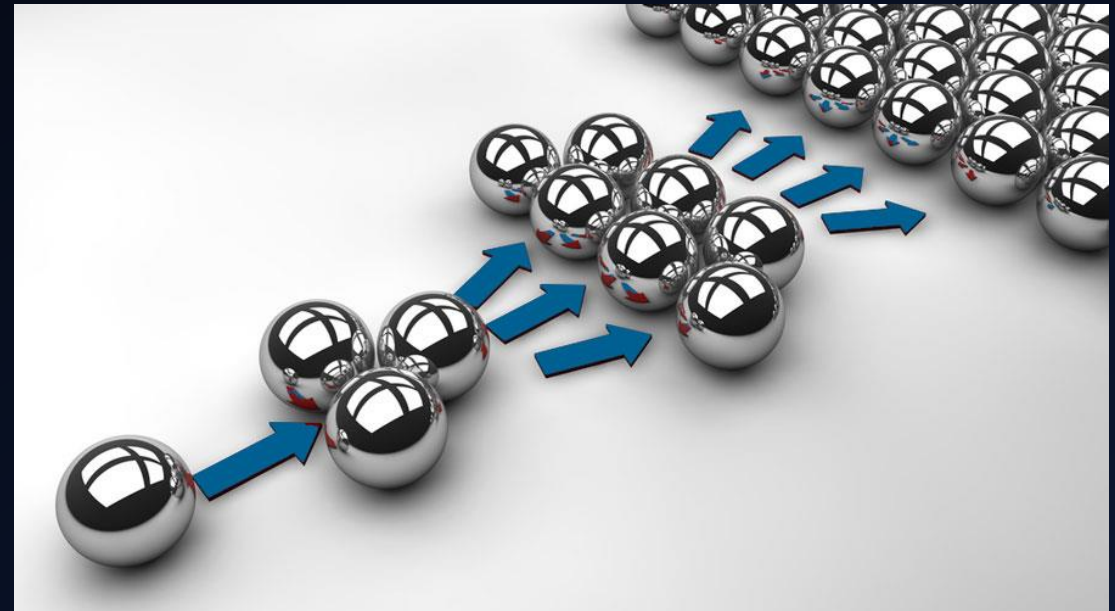
ΤΡΑΠΕΖΑ ΘΕΜΑΤΩΝ: «ΣΚΟΤΕΙΝΟΙ ΕΓΚΕΦΑΛΟΙ ΚΑΙ ΑΡΡΩΣΤΗΜΕΝΑ ΜΥΑΛΑ ΠΡΟΣΠΑΘΗΣΑΝ ΝΑ ΠΡΟΚΑΛΕΣΟΥΝ ΧΑΟΣ»

ΜΕΓΑ 200

ΜΠΟΡΕΙΤΕ ΝΑ ΔΕΙΤΕ LIVE TO LIVE NEWS ΑΠΟ ΤΟΝ ΥΠΟΛΟΓΙΣΤΗ, ΤΗ 16:40, 08

Impacts of Cyber Attacks

1. **Financial Losses**
2. Disruption of Services
3. **Data Breaches**
4. Reputational Damage
5. **Intellectual Property Theft**
6. National Security Concerns
7. **Privacy Violations**
8. Loss of Business Opportunities
9. **Psychological Impact**
10. Healthcare Disruptions
11. International Tensions
12. **Compliance and Legal Issues**
13. Loss of Trust in Digital Systems



How to create a robust cyber security strategy

1

Understand the
threat landscape

2

Identify your
critical assets

3

Implement security
measures

4

Train your
employees

5

Test your security
measures

6

Work with a Managed
Service Provider

What do we
need to
protect our
world ?



"Do you have any references besides Batman?"

Steve Purser
ENISA Head of Core Operations Department

- **Europe is lacking people with strong cybersecurity skills**
- **Not only do we not have enough people with experience in implementing security in the real world,**
- **We also do not have enough people with an adequate knowledge of security techniques.**
- **That is why we encourage young people to pursue a career in cybersecurity.”**



Theoretical skills @Cybersecurity

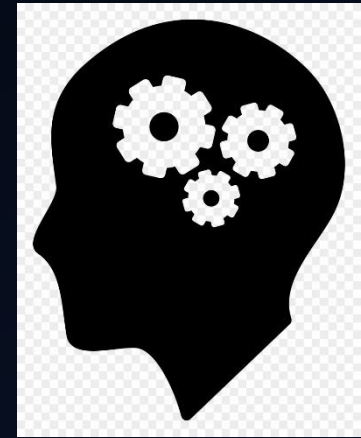
Can be acquired through formal education, industry certifications, hands-on experience, and participation in cybersecurity communities

1. Information / Data Security and Privacy
2. Threat Intelligence
3. Social Engineering
4. Governance, Risk Assessment and Management
5. Compliance and Legal
6. Communication and Collaboration
7. Problem-Solving/Analytical Skills/Critical Thinking



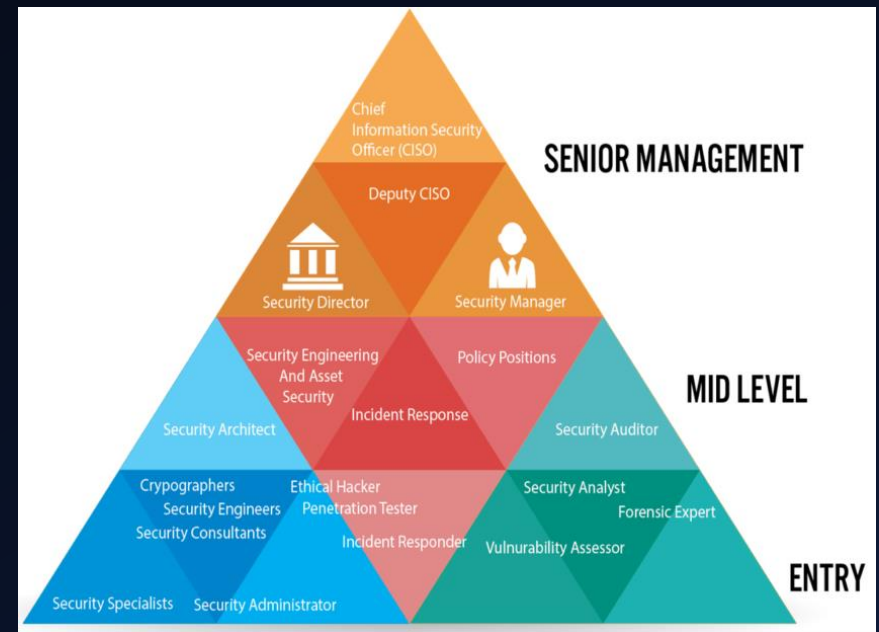
Technical Skills @Cybersecurity

1. Network Security
2. Operating Systems Security
3. Programming
4. Vulnerability Assessment and Penetration Testing
5. Incident Response and Forensics
6. Secure Software Development
7. Application Development Security
8. Cloud Security
9. Identity and Access Management (IAM)
10. Cryptography
11. IoT Security
12. Blockchain Security
13. Security Analytics and SIEM
14. Artificial Intelligence (AI)



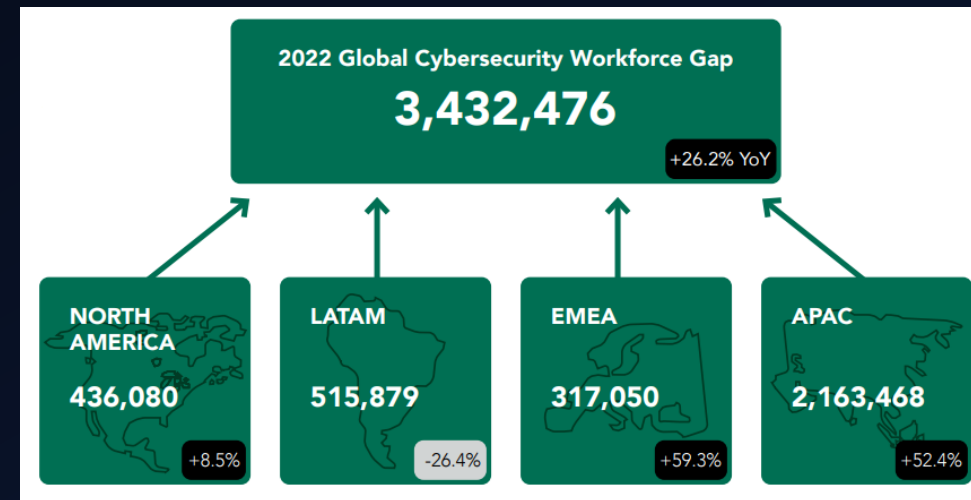
Job roles in cybersecurity

- Security Analyst
- Security Engineer
- Security Architect
- Ethical Hacker/Penetration Tester
- Security Consultant
- Incident Response Specialist
- Digital Forensics Analyst
- Threat Intelligence Analyst
- Malware Analyst/Reverse Engineer
- Security Operations Center (SOC) Analyst
- Information Security Manager
- Cloud Security Specialist
- Network Security Administrator
- Application Security Specialist
- Cybersecurity Risk Analyst
- Security Administrator/Database Administrator
- Identity and Access Management (IAM) Specialist
- Chief Information Security Officer (CISO)



Cybersecurity Skills Gap

- It refers to the problem that Europe and the rest of the world is lacking people with **strong cybersecurity skills**.
- The problem revolves around 2 equally important and troubling issues:
 - Not only are there not enough people with experience in implementing cybersecurity in the real world.
 - There aren't enough people with an adequate knowledge of cybersecurity techniques.
- In 2023, a **3,4 million shortage of cybersecurity professionals** is estimated.
- This number seems to be increasing every year



Cybersecurity Skills Gap

- It exists because of several factors including but not limited to the following:
 1. Rapidly evolving threat landscape
 2. Increased reliance on technology
 3. Lack of qualified professionals
 4. Education and training gaps
 5. Competition with cybercriminals
 6. Diversity and inclusion
 7. Limited awareness and interest
 8. Difficulty in recruiting and retaining talent
- The problem has worsened instead of getting better even though several bodies have published possible ways to mitigate the matter.



Cybersecurity Skills Gap

Reports published in 2022:

- **60%** of organizations experienced difficulties **retaining qualified cybersecurity professionals.**
- **63%** has **unfilled (open)** cybersecurity positions.
- **55%** reported that **less than 50%** of cybersecurity applicants are well qualified
- **43%** expects **an increase in cyberattacks** every year.
- **42%** reported that their cybersecurity **is appropriately funded**, **39%** that its somewhat **underfunded** and **15%** that its **significantly underfunded.**
- **43%** of organizations that have **a cybersecurity shortage**, reported that the biggest causes for their shortage is that **they can't find enough qualified talent,**

Cybersecurity Skills Gap

- There is also a difficulty of **retaining cybersecurity professionals**
- **84% of security professionals** report feelings of **burnout**.



THE HIGHEST PAYING EUROPEAN COUNTRIES FOR CYBER SECURITY PROFESSIONALS

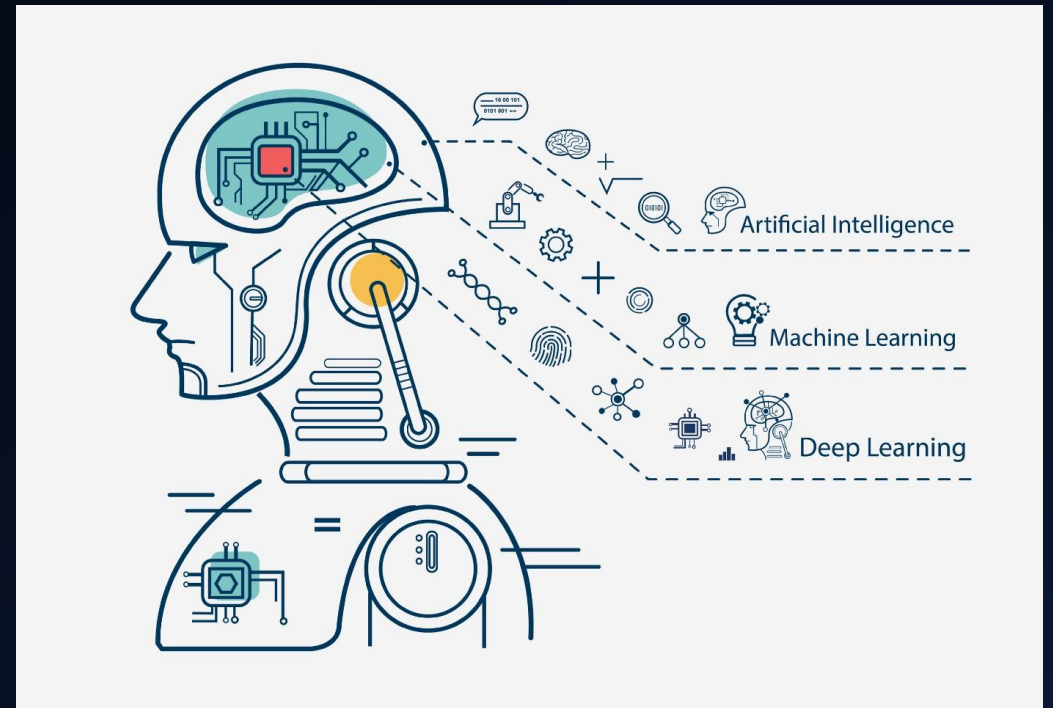


RANK	EUROPEAN COUNTRY	AVERAGE ANNUAL SALARY (€)
1	SWITZERLAND	€ 85,761
2	GERMANY	€ 65,012
3	NORWAY	€ 59,139
4	IRELAND	€ 56,932
5	BELGIUM	€ 56,400
6	LUXEMBOURG	€ 55,572
7	FRANCE	€ 51,939
8	AUSTRIA	€ 48,000
9	NETHERLANDS	€ 45,586
10	UNITED KINGDOM	€ 44,982
11	SLOVAKIA	€ 35,136
12	SWEDEN	€ 34,800
13	CZECH REPUBLIC	€ 34,524
14	ITALY	€ 31,999
15	SPAIN	€ 28,839
16	PORTUGAL	€ 24,179
17	RUSSIA	€ 23,934
18	ROMANIA	€ 23,382
19	HUNGARY	€ 20,472
20	POLAND	€ 15,765
21	TURKEY	€ 12,468
22	GREECE	€ 11,355

The Use of Artificial Intelligence in Cybersecurity

AI and Machine Learning can help to keep abreast with cybercriminals, automate threat detection, and respond more effectively than conventional software-driven or manual techniques.

- Three out of four executives say that AI allows an organization to respond faster to breaches.
- 69% of organizations think AI is necessary to respond to cyberattacks.
- Three in five firms say that using AI improves the accuracy and efficiency of cyber analysts.



ChatGPT

The **benefits** of automating AI in **cybersecurity**:



Ongoing learning



Discovering unknown
threats



Vast data volumes



Improved vulnerability
management

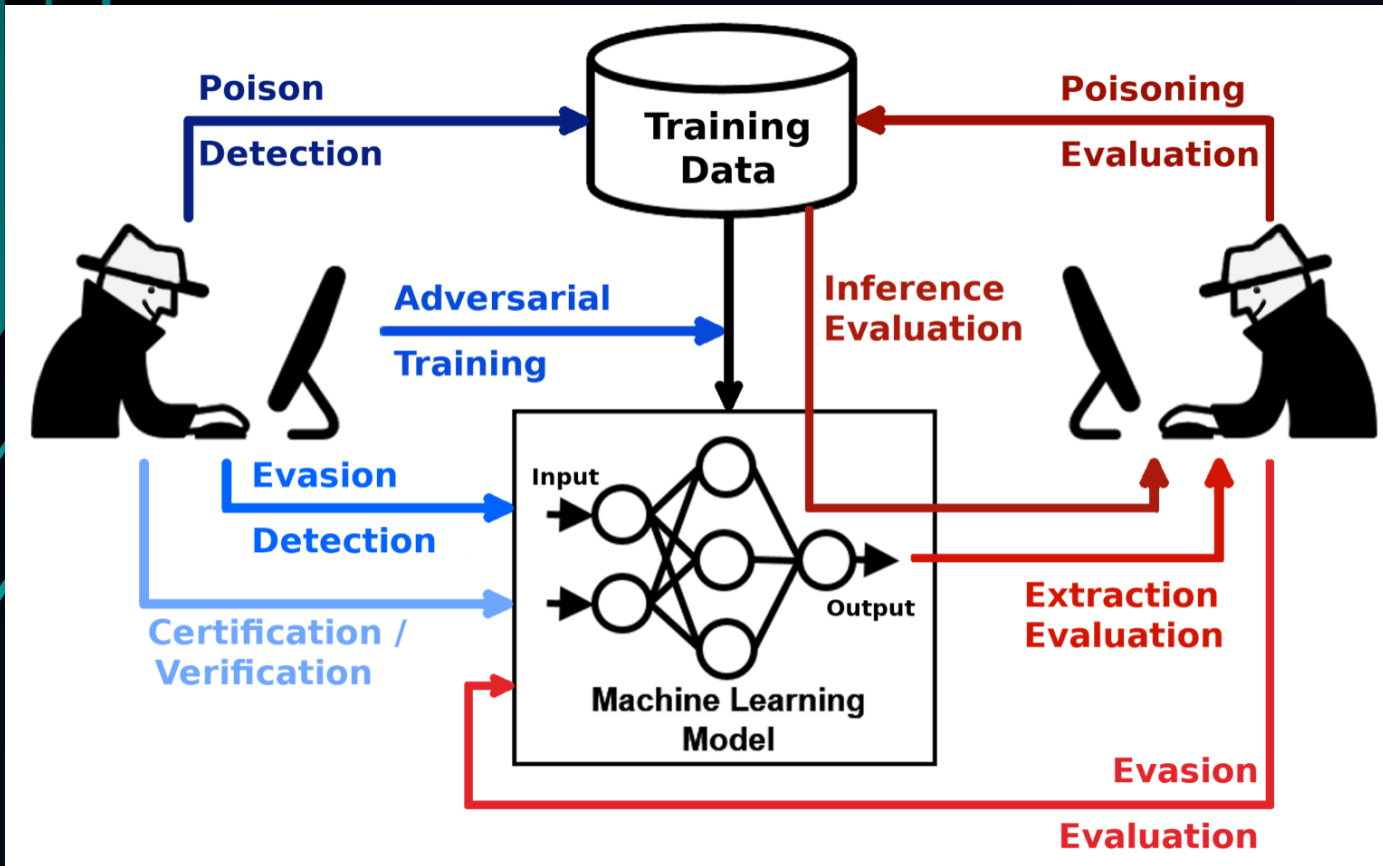


Enhanced overall
security posture



Better detection
and response

Adversarial Artificial Intelligence



We have joined forces to address this
Cybersecurity skills gap for Greece in
quantity and quality



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HOW

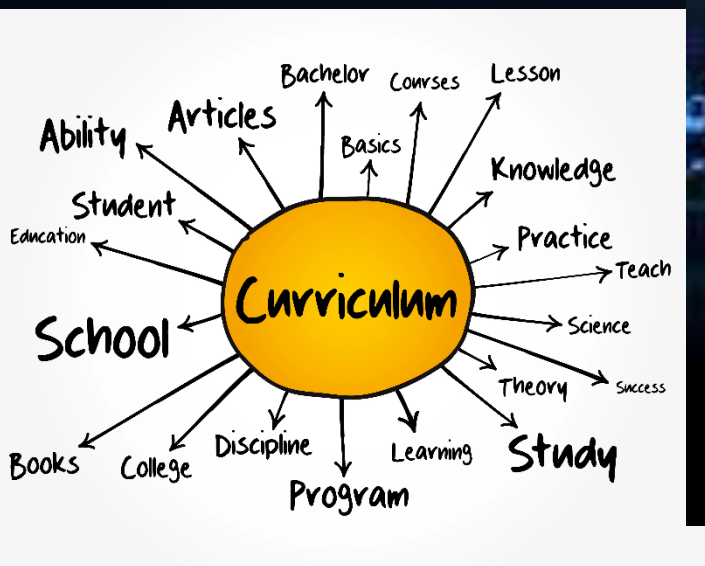


A Gamification of
Cybersecurity Learning

CAPTURE THE
FLAG (CTF)



ΠΑΝΕΛΛΗΝΙΟΣ ΜΑΘΗΤΙΚΟΣ
ΔΙΑΓΩΝΙΣΜΟΣ ΚΥΒΕΡΝΟΑΣΦΑΛΕΙΑΣ



CTFd

CTF
LIB



A few words about us ...

- University of Piraeus, Greece
- School of Information and Communication Technologies
- [Department of Digital Systems](#)
- [System Security Laboratory](#) founded in 2008
- Research, Development & Education
 - systems security, network security
 - computer security, forensics
 - risk analysis & management
- MSc course on “[Digital Systems Security](#)” since 2009



What we do for education

Undergraduate studies

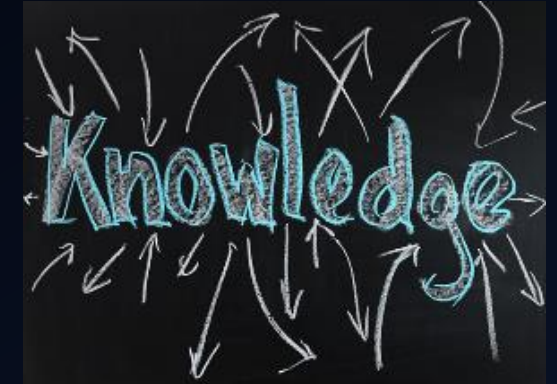
- Security Policies and Security Management
- Information Systems Security
- Network Security
- Cryptography
- Mobile, wireless network security
- Privacy enhancing technologies
- Bachelor Thesis
- Internet Privacy

To Be Updated
Soon



Areas of Expertise

- **Cyber Security Training**
- **Security analytics, AI security, Adversarial AI**
- **Cyber Insurance**
- **Smart Grid and IoT security**
- **Identity Access Management – IAM**
- **Trust Management**
- **Mobile – Wireless networks**
- **Network security**
- **Computer Security & Privacy**
- **Security evaluations, penetration testing & risk analysis – management**



R&D in numbers

- Participate in 15 R&D projects
 - 3 National (Greek) Project
 - 12 European Projects
 - We act as Coordinators in 4 Projects
 - 3 Marie Curie Projects
 - In 11 the Systems Security Lab is a project partner
 - While for 4 projects, SSL collaborates with other Labs of University of Piraeus





Academic Email

SSL E-mails

When you enroll in the Master of Science program, you'll receive an academic email address with the extension **@ssl-unipi.gr**. We will share these email account details with you through the personal email address you provided during enrollment

- Use these email addresses when **signing up** for our platforms.
- You will receive **notifications and announcements** related to the classes through these emails.
- Benefit of **unlimited Google Drive storage space**.

THANK YOU

